

NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE SPECIFICATION

IRRIGATION WATER CONVEYANCE

HIGH-PRESSURE, UNDERGROUND, PLASTIC PIPELINE

(feet)

CODE 430DD

SCOPE

This specification covers the installation of high pressure underground plastic irrigation pipelines. Construction shall be in accordance with the construction plans and these specifications.

MATERIALS

Pipeline materials and size shall be as specified on the plans. All fittings, couplers, valves, back flow prevention valves, air and vacuum release valves, pressure relief valves, pressure regulators, and filters shall be of the size and material specified and/or shown on the plans. All materials shall be field inspected for any deficiencies prior to installation.

The work shall consist of furnishing and installing high pressure plastic pipe and fittings to the lines and grades as shown on the drawings and/or as staked in the field.

MINIMUM DEPTH OF COVER

Pipe shall be installed at sufficient depth below the ground surface to provide protection from hazards imposed by traffic crossings, farming operations, or soil cracking. The minimum depth of cover for pipe shall be:

Pipe Diameter (inches)	Depth of Cover (inches)
1/2 through 2-1/2	18
3 through 5	24
6 or more	30

In areas where the pipe will not be subject to vehicular or cultivation hazards and the soils do not crack appreciably when dry, the minimum depth of cover may be reduced to:

Pipe Diameter (inches)	Depth of Cover (inches)
1/2 through 1-1/2	6
2 through 3	12
4 through 6	18
6 or more	24

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

The minimum cover for polyethylene pipe is 6 inches but may be reduced to 2 inches where conditions warrant.

Polyethylene plastic pipe, Grade 34, PE PE-3408, 4-inch maximum diameter, may be laid on ground surface at locations where minimal hazards are imposed by fire, farm operations and traffic. At vehicle crossings, encasement of pipe or other approved methods shall be used. In areas where burning is very likely, such as pineapple and sugarcane fields, the pipe shall be buried a minimum of 18 inches. Pipes laid on steep slopes should be anchored to control creep and resulting added stresses.

Solvent-welded joints shall be used at all connections of PVC pipe where peat and muck exist in their normal layered pattern. Rubber gasket joints may be used following normal bedding procedures where coarse sand or cement layers exist.

If the pipeline cannot be placed at the minimum depth below the ground surface, extra fill shall be placed over the pipeline

At low places on the ground surface, extra fill may be placed over the pipeline to provide the minimum depth of cover. The top width of the fill shall then be no less than 10 feet and the side slopes no steeper than 6:1. If extra protection is needed at vehicle crossing, encasement pipe or other approved methods may be used.

TRENCH CONSTRUCTION

Trench at any point below the top of the pipe shall only be wide enough to permit the pipe to be easily placed and joined and to allow the initial backfill material to be uniformly placed under the haunches and along the sides of the pipe. The trench width shall depend upon the type of compaction of the backfill, and the width shall be the pipe diameter plus:

- (a) for water saturation - not less than 12 inches nor more than 15 inches.
- (b) for mechanical compaction - not less than 24 nor more than 36 inches.

If the trench is precision excavated and has a semicircular bottom that closely fits the pipe, the width shall not exceed the outside diameter of the pipe by more than 10 percent.

The trench bottom shall be uniform so that the pipe lays on the bottom without bridging. Clods, rocks, and uneven spots that can damage the pipe or cause non-uniform support shall be removed.

If rocks, boulders, or any other material that can damage the pipe are encountered, the trench bottom shall be undercut a minimum of 4 inches below final grade and filled with bedding material consisting of sand or compacted fine-grained soils.

Pipelines having a diameter of ½ through 2½ inches that are to be placed in areas not subject to vehicular loads and in soils that do not crack appreciably when dry may be placed by using "plow-in" equipment instead of conventional trenching.

Provisions shall be made to insure safe working conditions where unstable soil, trench depth, or other conditions that can be hazardous to personnel working in the trench.

PLACEMENT

Care shall be taken to prevent permanent distortion and damage when handling the pipe. The pipe shall be allowed to come within a few degrees of the temperature it will have after it is completely covered before placing the backfill, other than that needed for shading, or before connecting the pipe to other facilities. The pipe shall be uniformly and continuously supported over its entire length on firm stable material. Blocking or mounding shall not be used to bring the pipe to final grade.

For pipe with bell joints, bell holes shall be excavated in the bedding material, as needed, to allow for unobstructed assembly of the joint and to permit the body of the pipe to be in contact with the bedding material throughout its length.

JOINTS AND CONNECTIONS

All joints and connections shall be designed and constructed to withstand the design maximum working pressure for the pipeline without leakage and to leave the inside of the line free of any obstruction that may lead to reduce its capacity below design requirements.

All fittings, such as couplings, reducers, bends, tees, and crosses, shall be installed according to the recommendations of the pipe manufacturer.

Fittings made of steel or other metals susceptible to corrosion shall be adequately protected by wrapping them with plastic tape or by applying a coating having high corrosion-preventative qualities. If plastic tape is used, all surfaces to be wrapped shall be thoroughly cleaned and coated with a primer compatible with the tape before wrapping.

THRUST BLOCKS

Thrust blocks must be formed against a solid hand-excavated trench wall undamaged by mechanical equipment. They shall be constructed of concrete, and the space between the pipe and trench wall shall be filled to the height of the outside diameter of the pipe or as specified by the manufacturer.

TESTING

The pipeline shall be tested for pressure strength, leakage, and proper functioning. The tests may be performed before backfilling or anytime after the pipeline is ready for service.

Tests for pressure strength and leaks shall be accomplished by inspecting the pipeline and appurtenances while the maximum working pressure is maintained and all joints and connections are uncovered, or by observing normal operation of the pipeline after it is put into service. Partial backfills needed to hold the pipe in place during testing shall be placed as specified in "Initial Backfill". Any leaks shall be repaired and the system retested.

The pipeline shall be tested to insure that it functions properly at design capacity. At or below design capacity there shall be no objectionable flow conditions such as water hammer, continuing unsteady delivery of water, damage to the pipeline, or detrimental discharge from control valves.

BACKFILL

Initial Backfill. Hand, mechanical, or water packing methods may be used.

The initial backfill material shall be soil or sand that is free from rocks or stones larger than 1 inch in diameter. At the time of placement, the moisture content of the material shall be of such that the required degree of compaction can be obtained with the backfill method to be used. The initial backfill material shall be placed so that the pipe will not be displaced, excessively deformed, or damaged.

If backfilling is done by hand or mechanical means, the initial fill shall be compacted firmly around and above the pipe as required to provide adequate lateral support to the pipe.

If the water packing method is used, the pipeline first shall be filled with water. The initial backfill before wetting, shall be of sufficient depth to insure complete coverage of the pipe after consolidation. Water packing is accomplished by adding water to diked reaches of the trench in sufficient quantity to thoroughly saturate the initial backfill without excessive pooling of water. After the backfill is saturated, the pipeline shall remain full until after the final backfill is made. The wetted fill shall be allowed to dry until firm before beginning the final backfill.

Final Backfill. The final backfill material shall be free of large rocks, and other debris greater than 3 inches in diameter. The material shall be placed and spread in approximately uniform layers so that there will be no unfilled spaces in the backfill and the backfill will be level with the natural ground or at the design grade required to provide the minimum depth of cover after settlement. Rolling equipment shall not be used to consolidate the final backfill until the specified minimum depth of cover has been placed.

All special backfilling requirements of the pipe manufacturer shall be met.

BASIS OF ACCEPTANCE

The acceptability of the pipeline shall be determined by inspections to check compliance with all the provisions of this standard and specification with respect to the drawings, pipe, pipe marking, the appurtenances, and the minimum installation requirements.

CERTIFICATION AND GUARANTEE

If requested by the engineer, a qualified testing laboratory must certify with supporting test results that the pipe meets the requirements specified in this standard. The seal of approval of a recognized laboratory on pipe bearing one of the ASTM designations listed in this standard may be accepted for this certification.

The installing contractor shall certify that the installation complies with the requirements of the standard and specification. The contractor shall furnish a written guarantee that protects the owner against defective workmanship and materials for not less than 1 year.

VEGETATIVE COVER

When specified, a protective cover of vegetation shall be established on the disturbed area. The planting of vegetative materials shall conform to the requirements of Standard Code 342, **Critical Area Planting.**

SPECIAL MEASURES

Measures and construction methods shall be incorporated as needed and practical that enhance fish and wildlife values. Special attention shall be given to protecting visual resources and maintaining key shade, food and den trees.

CONSTRUCTION OPERATIONS

Construction operations shall be carried out in such a manner and sequence that erosion and air and water pollution are minimized and held within legal limits.

The owner, operator, contractor or other persons will conduct all work and operations in accordance with proper safety codes for the type of construction being performed with due regards to the safety of all persons and property.

SAFETY

Land owners or operators, sponsoring organizations, and contractors shall be liable for damage to utilities and damage resulting from disruption of service caused by construction activities. The Natural Resources Conservation Service makes no representation on the existence or nonexistence of any utilities. Absence of utilities on the drawings is not assurance that no utilities are present at the site.

It is the responsibility of the land owner or operator to determine if there are buried or overhead utilities in the vicinity of the proposed work. They should take proper procedures to insure that the utilities shall not be jeopardized and that equipment operators and others will not be injured during construction operations.

OPERATION AND MAINTENANCE

An operation and maintenance plan must be prepared for use by the owner or others responsible for operating the system. The plan should provide specific instructions for operating and maintaining the system to insure that it functions properly. It should also provide for periodic inspections and prompt repair or replacement of damaged components.

A completed Operation and Maintenance Guide for Your Irrigation Water Conveyance, High-Pressure, Underground, Plastic Pipe will be included with the construction plans.